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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/889,326	07/11/2001	Gerhard Hartwich	PATKRIPO2AUS	2316
20210	7590	11/01/2006	EXAMINER	
DAVIS & BUJOLD, P.L.L.C. 112 PLEASANT STREET CONCORD, NH 03301			CALAMITA, HEATHER	
			ART UNIT	PAPER NUMBER
			1637	

DATE MAILED: 11/01/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/889,326	Applicant(s) HARTWICH, GERHARD	
	Examiner Heather G. Calamita, Ph.D.	Art Unit 1637	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 August 2006.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 127-150 and 152-197 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 127-150 and 152-197 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicants' submission filed on August 24, 2006, has been entered.

Status of Application, Amendments, and/or Claims

2. Claims 127-150 and 152-197 are pending and under examination. All arguments have been fully considered and thoroughly reviewed, but are deemed not persuasive for the reasons that follow. Any objections and rejections not reiterated below are hereby withdrawn.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 127-133, 136-150 and 152-197 are rejected under 35 U.S.C. 102(e) as being anticipated by Bamdad et al. (USPN 6,541,617).

Regarding claims 127 and 154-162, Bamdad et al. teaches a modified nucleic acid oligomer and a method of making said oligomer comprising a nucleic acid oligomer covalently attached to a single photoinducibly redox-active moiety, wherein the photoinducibly redox-active moiety comprises at least one electron-donor molecule and at least one electron-acceptor molecule, the at least one electron-donor molecule and the at least one electron-acceptor molecule not being joined by a nucleic acid oligomer and at least one electron-donor molecule being different from the at least one electron acceptor molecule (see Figures 1 and 3-5, col. 5, 12-14, 20, 34-36, 41-42, 44-46, 52-56, and 61, where Bamdad discloses Ruthenium bipyridine specifically at col. 60 lines 15-18. Ruthenium bipyridine is a redox-active complex, where one molecule of the complex acts as an electron donor and one molecule of the complex acts as an electron acceptor meeting the limitation of one electron donor molecule being different from the at least one electron acceptor molecule).

Regarding claims 128-129, Bamdad teaches the modified nucleic acid oligomer according to claim 127, wherein the redox-active moiety comprises at least one redox-active moiety, linked, to at least one bimolecular electron-donor/electron-acceptor complex, at least one electron-donor molecule of the redox-active moiety and at least one electron-acceptor molecule of the redox-active moiety being joined with one another via one or more bonds (e.g., covalent bonds) (see Figures 1 and 3-5, col. 5, 12-14, 20, 34-36, 41-42, 44-46, 52-56, and 61).

Regarding claims 130-133, Bamdad teaches the modified nucleic acid oligomer according to claim 127, wherein the redox-active moiety comprises at least one redox-active moiety, linked, to at least one bimolecular electron-donor/electron-acceptor complex, at least one electron-donor molecule of the redox-active moiety and at least one electron-acceptor molecule of the redox-active moiety being covalently joined via one or more branched or linear molecular moieties of any composition and chain length (e.g., 1-14 atoms) and the redox-moiety additionally comprises one or more macromolecules (see Figures 1 and 3-5, col. 5, 12-14, 20, 34-36, 41-42, 44-46, 52-56, and 61).

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Regarding claims 136-139, Bamdad teaches the modified nucleic acid oligomer according to claim 127, wherein at least one of the electron-donor molecules and electron-acceptor molecules is a pigment, such as a flavin, a (metallo)porphyrin, a (metallo)chlorophyll, a (metallo)bacteriochlorophyll, or a derivative of these pigments, or wherein at least one of the electron-donor molecules and electron-acceptor molecules is a nicotinamide or a quinone (e.g., a pyrroloquinoline quinone (PQQ), a 1,2-benzoquinone, a 1,4-benzoquinone, a 1,2-naphthoquinone, a 1,4-naphthoquinone, a 9,10-anthraquinone, or one of their derivatives (see cols. 41-42, for example).

Regarding claims 140-142, Bamdad teaches the modified nucleic acid oligomer according to claim 127, wherein at least one of the electron-donor molecules and electron-acceptor molecules is a charge transfer complex, such as a transition metal complex of Ru(II), Cr(III), Fe(II), Os(II), or Co(II) (see col. 42, for example).

Regarding claims 143-144, Bamdad teaches the modified nucleic acid oligomer according to claim 127, wherein the modified nucleic acid oligomer can sequence-specifically bind single-strand DNA, RNA, and/or PNA, and wherein the modified nucleic acid oligomer is a deoxyribonucleic acid oligomer, a ribonucleic acid oligomer, or a peptide nucleic acid oligomer (see col. 6-8 and 11-13, for example).

Regarding claims 145-150, Bamdad teaches the nucleic acid oligomer according to claim 127, wherein the redox-active moiety is covalently bound to one of the phosphoric-acid groups, to one of the carboxylic-acid groups, to one of the amine groups, or to a sugar of the nucleic acid oligomer backbone, or wherein the redox-active moiety is covalently attached to a thiol group, a hydroxyl group, a carboxylic-acid group, or an amine group of a modified base of the nucleic acid oligomer, or wherein the reactive thiol, hydroxyl, carboxylic-acid, or amine group of the base is covalently bound to the base via a branched or linear molecular moiety of any composition and chain length, the shortest continuous link between the thiol, hydroxyl, carboxylic-acid, or amine group and the base being a branched or linear

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molecular moiety having a chain length of 1-14 atoms, or wherein the redox-active moiety is attached to an end of the nucleic acid oligomer backbone or to a terminal modified base (see Figures 1 and 3-5, col. 6-7, 12-16, 20, 23, 32-38, 41-42, 44-46, 50, 52 and 61).

Regarding claims 152-153, Bamdad teaches the modified nucleic acid oligomer according to claim 127, wherein the redox-active moiety is photoinducibly redox-active moiety, or a chemically inducible redox-active moiety, and wherein multiple redox-active moieties are attached to the nucleic acid oligomer (see Figures 1 and 3-5, and cols. 41-44; for example).

Regarding claims 163-170, Bamdad teaches a modified conductive surface, comprising at least one type of modified nucleic acid oligomer according to claim 127 attached to a conductive surface, wherein the surface is a metal or a metal alloy, wherein the surface is a metal selected from platinum, palladium, gold, cadmium, mercury, nickel, zinc, carbon, silver, copper, iron, lead, aluminum and manganese, semiconductor materials, etc. (see col. 9, for example).

Regarding claims 171-183, Bamdad teaches the various methods of attaching the nucleic acid oligomer to the conductive surface and the various modified conductive surfaces required by the claims (see cols. 9-16 and 23-26, for example).

Regarding claims 184-187, Bamdad teaches methods of producing the modified conductive surface (see Figures 4-5 and cols. 9-13, 22-25 and 39-40, for example).

Regarding claims 188-197, Bamdad teaches method of electrochemically detecting hybridization events (see cols. 57-67, for example).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be

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patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 134-135 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bamdad et al. (USPN 6,541,617), as applied to Claims 127-133 and 136-197, in view of Haberle et al. (Laser in Forschung und Technik Vortage des Internationalen Kongresses; 12th, Munich, June 1995: 179-184).

The teachings of Bamdad are presented above. Bamdad teaches a modified nucleic acid oligomer comprising a nucleic acid oligomer attached to a single redox-active moiety, wherein the redox-active moiety comprises at least one electron-donor molecule and at least one electron-acceptor molecule, the at least one electron-donor molecule and the at least one electron-acceptor molecule not being joined by a nucleic acid oligomer and at least one electron-donor molecule being different from the at least one electron acceptor molecule. Bamdad does not teach the redox-moiety comprising the reaction center of photosynthesizing bacteria.

However, Haberle teaches the “ultrafast electron transfer in modified photosynthetic reaction centers from Rhodobacter sphaeroides” (see title and abstract, where the reaction center necessarily comprises apoprotein). That is, Haberle teaches the electron transfer that occurs within a redox-moiety comprising the reaction center of photosynthesizing bacteria proceeds at an “ultrafast” rate.

Accordingly, in view of the teachings of Haberle, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the method of Bamdad so as to have used a redox-moiety comprising the reaction center of photosynthesizing bacteria. One of ordinary skill in the art would have been motivated to modify the method of Bamdad in order to have achieved the benefit of providing a more efficient electron transfer reaction by utilizing the “ultrafast” means of electron transfer that occurs within a redox-moiety comprising the reaction center of photosynthesizing bacteria.

Response to Arguments

5. Applicant's arguments filed July 31, 2006 have been fully considered but they are not persuasive.

With regard to the 102 rejections, Applicant argues on p. 12 and 13 of the response, the instant claims require the presence of both a donor molecule and an acceptor molecule within the redox active moiety. Applicant argues Bamdad does not teach or suggest donor-acceptor complexes. This argument is not persuasive because Bamdad disclose a donor acceptor pair of ruthenium bipyridine at col. 60 lines 15-18. Ruthenium bipyridine is a redox-active complex where one molecule of the complex acts as an electron donor and one molecule of the complex acts as an electron acceptor. Applicants additionally argue Bamdad disclose the same kind of molecule as the electron donor and acceptor. This argument is not persuasive because Bamdad discloses at col. 42 lines 21-35, a list of appropriate transition metals and ruthenium is preferred and at col. 42 lines 36-50, Bamdad discloses ligands with which the transition metals complex and bipyridine is listed here so that the molecules are different and form a redox-active complex where one acts as the electron donor and the other acts as an electron acceptor.

Finally, Applicant argues Bamdad does not specifically disclose a donor acceptor complex. This argument is not persuasive because Bamdad discloses ruthenium bipyridine at col. 60 lines 15-18 which is a donor acceptor complex. Because ruthenium bipyridine is a donor acceptor complex it is irrelevant whether Bamdad discloses its use as a donor-acceptor complex.

With respect to the 103 rejections, Applicant argues while Bamdad is a proper prior art citation under 35 U.S.C. 102 (e) it is not a proper prior art citation under 35 U.S.C. 103 because the issue date of Bamdad is April 1, 2003 which is well after the January 18, 1999 priority date of the instant application. This argument is not persuasive because art that is available as prior art under 102 is also available as prior art under 103. See MPEP 2141.01 I. which states

I. PRIOR ART AVAILABLE UNDER 35 U.S.C. 102 IS AVAILABLE UNDER 35 U.S.C. 103
"Before answering Graham 's content' inquiry, it must be known whether a patent or

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publication is in the prior art under 35 U.S.C. § 102.” *Panduit Corp. v. Dennison Mfg. Co.*, 810 F.2d 1561, 1568, 1 USPQ2d 1593, 1597 (Fed. Cir.), cert. denied, 481 U.S. 1052 (1987). Subject matter that is prior art under 35 U.S.C. 102 can be used to support a rejection under section 103. *Ex parte Andresen*, 212 USPQ 100, 102 (Bd. Pat. App. & Inter. 1981) (“it appears to us that the commentator [of 35 U.S.C.A.] and the [congressional] committee viewed section 103 as including all of the various bars to a patent as set forth in section 102.”).

Summary

6. No claims were allowable.

Correspondence

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Heather G. Calamita whose telephone number is 571.272.2876 and whose e-mail address is heather.calamita@uspto.gov. However, the office cannot guarantee security through the e-mail system nor should official papers be transmitted through this route. The examiner can normally be reached on Monday through Thursday, 7:00 AM to 5:30 PM.

If attempts to reach the examiner are unsuccessful, the examiner’s supervisor, Gary Benzion can be reached at 571.272.0782.

Papers related to this application may be faxed to Group 1637 via the PTO Fax Center using the fax number 571.273.8300.

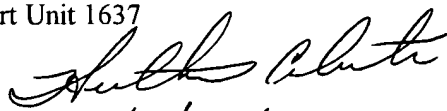
Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to 571.272.0547.

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Heather Calamita

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10/28/2006